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SUMMARY OF THE CLAIMS

Claim 1 (currently amended)

1. (Amended) A solid-state imaging device, comprising:  
a semiconductor substrate;  
a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor substrate;  
a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge; ~~and~~  
a passivation section having a substantially flat top surface and a refractive index and overlying the light shielding section, the light reception section and the aperture; and  
a planarization section overlying the substantially flat top surface of said passivation section, wherein the planarization section has a refractive index smaller than the refractive index of the passivation section.

Claims 2-4 (original)

2. A solid-state imaging device according to claim 1, wherein the passivation section comprises at least a silicon nitride-based monolayer film.
3. A solid-state imaging device according to claim 1, further comprising an insulation section having a substantially flat top surface which is interposed between the passivation section and the light shielding section.
4. A solid-state imaging device according to claim 3, wherein the insulation section comprises at least a silicon oxide-based monolayer film.

Claim 5 (currently amended)

5. (Amended) A method for producing a solid-state imaging device, wherein the device comprises:  
a semiconductor substrate;

a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor substrate;

a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge; ~~and~~

a passivation section having a substantially flat top surface and overlying the light shielding section, the light reception section and the aperture; and

a planarization section overlying the substantially flat top surface of said passivation section, wherein the planarization section has a refractive index smaller than the refractive index of the passivation section, wherein the method comprises the steps of:

forming a thin film used for forming the passivation, section on the light shielding section and the aperture; ~~and~~

flattening a surface of the thin film to form the passivation section by chemical machine polishing; and

forming a thin film used for forming the planarization section atop the substantially flat top surface of the passivation section; and

flattening a surface of the thin film used for forming the passivation section by chemical machine polishing.

Claim 6 (previously amended)

6. (Amended) A method for producing a solid-state imaging device, wherein the device comprises:

a semiconductor substrate;

a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor substrate;

a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge; and

a passivation section having a substantially flat top surface and overlying the light shielding section, the light reception section and the aperture so as to provide moisture and chemical resistance and to provide barrier properties against impurities, wherein the method comprises the steps of:

forming a thin film used for forming the passivation section on the light shielding section;

applying an SOG film to the thin film used for forming the passivation section;  
and

flattening a surface of the thin film to form the passivation section by performing an etchback technique under a condition that a selective ratio of the SOG film to the thin film used for forming the passivation section is about 1:1.

Claims 7 and 8 (presently amended)

7. (Twice Amended) A method for producing a solid-state imaging device, wherein the device comprises:

a semiconductor substrate;

a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor substrate;

a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge; ~~and~~

a passivation section having a substantially flat top surface and overlying the light shielding section, the light reception section and the aperture so as to provide moisture and chemical resistance and to provide barrier properties against impurities, and an insulation section having a substantially flat top surface which is interposed between the passivation section and the light shielding section; and

a planarization section overlying the substantially flat top surface of said passivation section, wherein the planarization section has a refractive index smaller than the refractive index of the passivation section, wherein the method comprises the steps of:

forming the insulation section on the light shielding section;

flattening a surface of the insulation section by chemical machine polishing;  
and

forming the passivation section so as to have the substantially flat top surface by depositing a material used for forming the passivation section on the insulation section; and

forming the planarization section by depositing a material used for forming the planarization section on the substantially flat top surface of the passivation section.

8. (Twice Amended) A method for producing a solid-state imaging device, wherein the device comprises:

a semiconductor substrate;

a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor substrate;

a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge;

a passivation section having a substantially flat top surface and overlying the light shielding section, a light reception section and the aperture;

a planarization section overlying the substantially flat top surface of said passivation section, wherein the planarization section has a refractive index smaller than the refractive index of the passivation section; and

an insulation section having a substantially flat top surface which is interposed between the passivation section and the light shielding section so as to provide moisture and chemical resistance and to provide barrier properties against impurities, wherein the method comprises the steps of:

forming the insulation section so as to have the substantially flat top surface by applying an SOG film to the light shielding section and the aperture; and

forming the passivation section so as to have the substantially flat top surface by depositing a material used for forming the passivation section on the insulation section; and

forming the planarization section by depositing a material used for forming the passivation section on the substantially flat top surface of the passivation section.

Claims 9-14 (original)

9. A solid-state imaging device according to claim 1, wherein the passivation section comprises at least a SOG film.

10. A solid-state imaging device according to claim 4, wherein the insulation section comprises at least a SOG film.

11. A method according to claim 5, wherein the method further comprises the step of forming a SOG film to the passivation section.

12. A method according to claim 7, wherein the method further comprises the step of forming a SOG film to the passivation section.

13. A solid-state imaging device, comprising:

- a semiconductor substrate;
- a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor substrate;
- a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge; and
- a passivation section having a substantially flat top surface and overlying the light shielding section, the light reception section and the aperture so as to provide moisture and chemical resistance and to provide barrier properties against impurities and others.

14. A method for producing a solid-state imaging device, wherein the device comprises:

- a semiconductor substrate;
- a light shielding section having an aperture for partially shielding light incident on a surface of the semiconductor;
- a light reception section for converting the light which is incident on the surface of the semiconductor substrate through the aperture to an electric charge; and
- a passivation section having a substantially flat top surface and overlying the light shielding section, the light reception section and the aperture so as to provide moisture and chemical resistance and to provide barrier properties against impurities and others, wherein the method comprises the steps of: